WHAT IS CLAIMED IS:

1. A method for determining segment bandwidth capacity of a test segment in a network, the method comprising:

sending a plurality of packet profiles from a plurality of source nodes to a plurality of destination nodes via links, each link connecting a source node with a destination node, each link including the test segment;

manipulating start times for sending the plurality packet profiles, or a portion thereof, from the plurality of source nodes. or a portion thereof, so that the plurality of packet profiles flow through the test segment essentially simultaneously; and

receiving the plurality of packet profiles at the plurality of destination nodes, wherein each of the packet profiles comprises a plurality of packets, and byte count measurements and time stamps are made at the plurality of destination nodes.

2. The method of claim 1, wherein a central server is utilized to command the plurality of source nodes to send the plurality of packet profiles at specific times, including the manipulation of the start times for the plurality of packet profiles.

3. The method of claim 1, wherein the network is a time synchronized network and each of the plurality of packet profiles is a packet burst.

4. The method of claim 3, wherein the length L of each of the packet bursts is related to the Degree of Desynchronization (DoD) by an expression, $L = \frac{DoD}{ErrLim}$, where ErrLim represents a maximum desired error in the segment bandwidth capacity determination.

5. The method of claim 4, wherein the time stamps made at each of the plurality of destination nodes are a first time stamp TS_{first} of the first packet of the packet burst received from each corresponding source node and a last time stamp TS_{last} of the last packet of the packet burst received from each corresponding source node, and the byte count measurements measure the bytes $Bytes_{total}$ in each of the packet bursts received at each corresponding destination node.

6. The method of claim 5, wherein an individual flow rate in bit per second due to each packet burst is calculated using an expression, $Rate(bps) = \frac{Bytes_{total} * 8}{TS_{last} - TS_{first}}$, and a total flow rate through the test segment is the sum of all individual flow rates.

7. The method of claim 1, wherein the network is a non-time synchronized network and each of the plurality of packet profiles is a packet stream, and a plurality of byte count measurements are made over a time measurement period T at each of the plurality of destination nodes.

8. The method of claim 7, wherein the length $L_{multiple}$ of the packet stream is related to the Degree of Desynchronization (DoD) by an expression, $L_{multiple} = (4 * T) + 2\varepsilon$, where the

time measurement period T is one half of DoD and epsilon ε is used to compensate for small timing errors.

9. The method of claim 8, wherein the time stamps made at each of the plurality of destination nodes are a plurality of time measurements MT_n, where n is an integer, each time measurements MT_n being separated by the time measurement period T and each measuring byte count over the period T since last time measurement MT_{n-1} in each of the packet streams received at each corresponding destination node.

10. The method of claim 9, wherein an individual flow rate in bit per second due to each packet stream at the test segment is related to the smallest byte count measurement $Bytes_{total}$ of all byte count measurements taken for the packet stream, the individual flow rate being calculated using an expression, $Rate(bps) = \frac{Bytes_{total} * 8}{MT_n - MT_{n-1}}$, and a total flow rate through the test segment is the sum of all individual flow rates.

11. The method of claim 1, wherein a link bandwidth capacity of a link is determined by measuring the bandwidth capacity of each of the segments that make up the link, the link having a maximum throughput of the slowest segment in the link.

12. A method for determining bandwidth capacity of a test segment in a time synchronized network, the method comprising:

sending a packet burst from a source node to a destination node via a link, the link including at least the test segment; and

receiving the packet burst at destination node, the packet burst comprising a plurality of packets, wherein a first time stamp TS_{first} of the first packet of the packet burst, a last time stamp TS_{last} of the last packet of the packet burst and a byte count measurement measuring the bytes $Bytes_{total}$ in the packet burst are made at the destination node, the bandwidth capacity of the test segment in bit per second being calculated using an expression,

$$Rate(bps) = \frac{Bytes_{total} * 8}{TS_{last} - TS_{first}}.$$

13. The method of claim 12, wherein the length L of the packet burst is related to the Degree of Desynchronization (DoD) by an expression, $L = \frac{DoD}{ErrLim}$, where ErrLim represents a maximum desired error in the bandwidth capacity determination

14. A method for determining bandwidth capacity of a test segment in a non-time synchronized network, the method comprising:

sending a packet stream from a source node to a destination node via a link, the link including at least the test segment, the packet stream having a length L_{single} that ensures at least two measurements for byte count measurement can be made at the destination node;

receiving the packet stream at destination node, the packet stream comprising a plurality of packets;

taking at least two measurements MT_{first}, MT_{second} at the destination node while the packet stream is being received, the two measurements MT_{first}, MT_{second} being separated by a measurement period T; and

making a byte count measurement measuring the bytes $Bytes_{total}$ in the packet stream between the measurements MT_{first}, MT_{second} at the destination node, the bandwidth capacity of the test segment in bit per second being calculated using an expression,

$$Rate(bps) = \frac{Bytes_{total} * 8}{MT_{second} - MT_{first}}.$$

15. The method of claim 14, wherein the length L_{single} of the packet stream is greater than or equal to (2 * T) + 2ε, where epsilon is used to compensate for small timing error.

16. The method of claim 14, further comprising triggering the destination SN to take the first measurement MT_{first} when it receives the first few packets in the packet stream, wherein the length L_{single} of the packet stream is greater than or equal to T + 2ε, where epsilon is used to compensate for small timing error.

17. A network system for determining bandwidth capacity of a test segment in a network, comprising:

a plurality of links interconnecting nodes residing on the edge of the network, each of the link being made up of at least one segment;

a plurality of source nodes that send a plurality of packet profiles for traveling through links, each link including the test segment, the plurality of packet profiles, or a portion

thereof, being sent at specific times so that the plurality of packet profiles flow through the test segment essentially simultaneously;

a plurality of destination nodes that receive the plurality of packet profiles, wherein each of the packet profiles comprises a plurality of packets, and byte count measurements and time stamps are made at the plurality of destination nodes.

18. The network system of claim 17, further comprising a central server that commands the plurality of source nodes to send the plurality of packet profiles at specific times, including the manipulation of start times for the sending of the plurality of packet profiles, or a portion thereof.

19. The network system of claim 17, wherein the network is a time synchronized network and each of the plurality of packet profiles is a packet burst.

20. The network system of claim 19, wherein the length L of each of the packet bursts is related to the Degree of Desynchronization (DoD) by an expression, $L = \frac{DoD}{ErrLim}$, where ErrLim represents a maximum desired error in the segment bandwidth capacity determination.

21. The network system of claim 20, wherein the time stamps made at each of the plurality of destination nodes are a first time stamp TS_{first} of the first packet of the packet burst received from each corresponding source node and a last time stamp TS_{last} of the last packet of the packet burst received from each corresponding source node, and the byte count

measurements measure the bytes $Bytes_{total}$ in each of the packet bursts received at each corresponding destination node.

22. The network system of claim 21, wherein an individual flow rate in bit per second due to each packet burst is calculated using an expression, $Rate(bps) = \frac{Bytes_{total} * 8}{TS_{last} - TS_{first}}$, and a total flow rate through the test segment is the sum of all individual flow rates.

23. The network system of claim 17, wherein the network is a non-time synchronized network and each of the plurality of packet profiles is a packet stream, and a plurality of byte count measurements are made over a time measurement period T at each of the plurality of destination nodes.

24. The network system of claim 23, wherein the length $L_{multiple}$ of the packet stream is related to the Degree of Desynchronization (DoD) by an expression, $L_{multiple} = (4 * T) + 2\varepsilon$, where the time measurement period T is one half of DoD and epsilon ε is used to compensate for small timing errors.

25. The network system of claim 24, wherein the time stamps made at each of the plurality of destination nodes are a plurality of time measurements MT_n, where n is an integer, each time measurements MT_n being separated by the time measurement period T and each measuring byte count over the period T since last time measurement MT_{n-1} in each of the packet streams received at each corresponding destination node.

26. The network system of claim 25, wherein an individual flow rate in bit per second due to each packet stream at the test segment is related to the smallest byte count measurement $Bytes_{total}$ of all byte count measurements taken for the packet stream, the individual flow rate being calculated using an expression, $Rate(bps) = \frac{Bytes_{total} * 8}{MT_n - MT_{n-1}}$, and a total flow rate through the test segment is the sum of all individual flow rates.

27. The network system of claim 17, wherein a link bandwidth capacity of a link is determined by measuring the bandwidth capacity of each of the segments that make up the link, the link having a maximum throughput of the slowest segment in the link.

28. The network system of claim 17, wherein the nodes are distributed at the edges of the network and exist in stand-alone boxes.

29. The network system of claim 17, wherein the nodes are added as software modules to existing end hosts or network devices.

30. A computer readable medium for use in conjunction with a network system including a plurality of nodes for determining segment bandwidth capacity, the computer readable medium including computer readable instructions encoded thereon for:

sending a plurality of packet profiles from a plurality of source nodes to a plurality of destination nodes via links, each link connecting a source node with a destination node, each link including the test segment;

manipulating start times for sending the plurality packet profiles, or a portion thereof, from the plurality of source nodes. or a portion thereof, so that the plurality of packet profiles flow through the test segment essentially simultaneously; and

receiving the plurality of packet profiles at the plurality of destination nodes, wherein each of the packet profiles comprises a plurality of packets, and byte count measurements and time stamps are made at the plurality of destination nodes.

31. The computer readable medium of claim 30, wherein the network is a time synchronized network and each of the plurality of packet profiles is a packet burst.

32. The computer readable medium of claim 31, wherein the length L of each of the packet bursts is related to the Degree of Desynchronization (DoD) by an expression, $L = \frac{DoD}{ErrLim}$, where ErrLim represents a maximum desired error in the segment bandwidth capacity determination.

33. The computer readable medium of claim 32, wherein the time stamps made at each of the plurality of destination nodes are a first time stamp TS_{first} of the first packet of the packet burst received from each corresponding source node and a last time stamp TS_{last} of the last packet of the packet burst received from each corresponding source node, and the byte count measurements measure the bytes $Bytes_{total}$ in each of the packet bursts received at each corresponding destination node.

34. The computer readable medium of claim 33, wherein an individual flow rate in bit per second due to each packet burst is calculated using an expression, $Rate(bps) = \frac{Bytes_{total} * 8}{TS_{last} - TS_{first}}$, and a total flow rate through the test segment is the sum of all individual flow rates.

35. The computer readable medium of claim 30, wherein the network is a non-time synchronized network and each of the plurality of packet profiles is a packet stream, and a plurality of byte count measurements are made over a time measurement period T at each of the plurality of destination nodes.

36. The computer readable medium of claim 35, wherein the length $L_{multiple}$ of the packet stream is related to the Degree of Desynchronization (DoD) by an expression, $L_{multiple} = (4 * T) + 2\varepsilon$, where the time measurement period T is one half of DoD and epsilon ε is used to compensate for small timing errors.

37. The computer readable medium of claim 36, wherein the time stamps made at each of the plurality of destination nodes are a plurality of time measurements MT_n, where n is an integer, each time measurements MT_n being separated by the time measurement period T and each measuring byte count over the period T since last time measurement MT_{n-1} in each of the packet streams received at each corresponding destination node.

38. The computer readable medium of claim 37, wherein an individual flow rate in bit per second due to each packet stream at the test segment is related to the smallest byte count

measurement $Bytes_{total}$ of all byte count measurements taken for the packet stream, the individual flow rate being calculated using an expression, $Rate(bps) = \frac{Bytes_{total} * 8}{MT_n - MT_{n-1}}$, and a total flow rate through the test segment is the sum of all individual flow rates.

39. The computer readable medium of claim 30, wherein a link bandwidth capacity of a link is determined by measuring the bandwidth capacity of each of the segments that make up the link, the link having a maximum throughput of the slowest segment in the link.

40. A computer readable medium for use in conjunction with a time synchronized network system including a plurality of nodes for determining segment bandwidth capacity, the computer readable medium including computer readable instructions encoded thereon for:

sending a packet burst from a source node to a destination node via a link, the link including at least the test segment; and

receiving the packet burst at destination node, the packet burst comprising a plurality of packets, wherein a first time stamp TS_{first} of the first packet of the packet burst, a last time stamp TS_{last} of the last packet of the packet burst and a byte count measurement measuring the bytes $Bytes_{total}$ in the packet burst are made at the destination node, the bandwidth capacity of the test segment in bit per second being calculated using an expression,

$$Rate(bps) = \frac{Bytes_{total} * 8}{TS_{last} - TS_{first}}.$$

41. The computer readable medium of claim 40, wherein the length L of the packet burst is related to the Degree of Desynchronization (DoD) by an expression, $L = \frac{DoD}{ErrLim}$, where ErrLim represents a maximum desired error in the bandwidth capacity determination

42. A computer readable medium for use in conjunction with a non-time synchronized network system including a plurality of nodes for determining segment bandwidth capacity, the computer readable medium including computer readable instructions encoded thereon for:

sending a packet stream from a source node to a destination node via a link, the link including at least the test segment, the packet stream having a length L_{single} that ensures at least two measurements for byte count measurement can be made at the destination node,

receiving the packet stream at destination node, the packet stream comprising a plurality of packets;

taking at least two measurements MT_{first}, MT_{second} at the destination node while the packet stream is being received, the two measurements MT_{first}, MT_{second} being separated by a measurement period T; and

making a byte count measurement measuring the bytes $Bytes_{total}$ in the packet stream between the measurements MT_{first}, MT_{second} at the destination node, the bandwidth capacity of the test segment in bit per second being calculated using an expression,

$$Rate(bps) = \frac{Bytes_{total} * 8}{MT_{second} - MT_{first}}.$$

43. The computer readable medium of claim 42, wherein the length L_{single} of the packet stream is greater than or equal to (2 * T) + 2ε, where epsilon is used to compensate for small timing error.

44. The computer readable medium of claim 42, further comprising computer readable instruction encoded thereon for triggering the destination SN to take the first measurement MT_{first} when it receives the first few packets in the packet stream, wherein the length L_{single} of the packet stream is greater than or equal to T + 2ε, where epsilon is used to compensate for small timing error.

45. The method of claim 1, wherein at least two of the plurality of packet profiles from at least two of the plurality of source nodes may be sent to the same destination node.

46. The network system of claim 17, wherein at least two of the plurality of packet from at least two of the plurality of source nodes profiles may be received by the same destination node.

47. The computer readable medium of claim 30, wherein at least two of the plurality of packet profiles from at least two of the plurality of source nodes may be sent to the same destination node.